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## HERC Technical Report 15

# The Effects on Measured Workload and Costs of Limiting CPT Codes in the NPCD SE File

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**Executive Summary**

The current programming rules for the creation of the SAS SE extract of the National Patient Care Data (NPCD) outpatient encounters database allows no repetition of Common Procedural Terminology (CPT) codes and sets a maximum limit of 15 CPT codes per record. However, the source Oracle database in Austin, from which the SAS extracts are created, contains an array that has a maximum of 500 CPT occurrences and that imposes no restrictions on repetition of CPT codes.

To address concerns about the data currently excluded from the NPCD SE SAS extract, a special 10% random sample of the NPCD outpatient encounters data was created that allowed repetition of CPT codes and up to 500 CPT codes per record. This file was used to examine the implications of the current limits and to recommend potential changes.

The analysis found that the current programming rules for the NPCD SE SAS extract exclude about 12% of the CPT codes in the Oracle database. Further, very few of the repeat uses of CPT codes within clinical encounters appear to be inappropriate. As a result of these findings, we recommend that changes be made to the programming rules that create the NPCD SE SAS extract.

**Recommendations**

1. Repetition of CPT codes should be allowed in the NPCD SE SAS extract.

2. No restrictions should be imposed on which CPT codes can be used more than once in a record.

3. The number of CPT code fields in the NPCD SE SAS extract should be increased from 15 to 20.

4. A new variable in the NPCD SE SAS extract should report the number of CPT codes associated with each encounter that is stored in the Oracle database.

5. VHA staff should instruct facilities to have the CPT codes that are automatically generated come after the other CPT codes for each encounter.

**Background**

The current programming rules for the creation of SAS extract of the NPCD allows no repetition of CPT codes and set a maximum limit of 15 CPT codes per record. However, the source Oracle database in Austin, from which the SAS extracts are created, contains an array that has a maximum of 500 CPT occurrences that imposes no restrictions on repetitions of CPT codes.

HERC was concerned that these rules might affect studies that rely on CPT codes to characterize utilization and calculate cost. There are some CPT codes that are designed to be used more than one time per encounter. Many of these are for time increments of service, such as 15 minutes. In the FY 01 SE file with no repetition of CPT codes, HERC counted more than 3.7 million uses of CPT codes that were designed to be replicated within encounters. In a previous partial analysis of the entire Oracle FY 03 data without limits on CPT codes, VHA National Data Systems (NDS) staff found that about 1.8% of the records in the NPCD had more than 15 CPT codes recorded. Thus, it is possible that both of the production programming rules may affect studies of the utilization and costs of VA outpatient care.

**Objectives**

The object of this study was to provide an overview and impact analysis of the NPCD extract creation rules that limit the number of CPT codes and prohibit repetition of codes with an encounter. We addressed several questions:

- What percentage of records had more than 15 CPT codes?
- In records with repeated codes, does the repetition appear to be justified?
- How much of the workload was excluded by the creation rules if we measure workload by the count of CPT codes?
- How much of the workload was excluded by the creation rules if we measure workload by the average Medicare reimbursement for each CPT code?

**Data**

Sample. NDS staff created a 10% random sample SAS extract of the NPCD outpatient encounters. They allowed repetition of CPT codes and limited each record to a maximum of 500 CPT codes. The sample contained 6,476,541 records. The maximum number of CPT codes in a single record was 302.

Estimation of costs. While information on the number of CPT codes excluded from the SE file is informative, numbers of CPT codes do not fully reflect the workload or resource consumption associated with these CPT codes. The SE file does not include any data about the costs of care. HERC regularly estimates the costs of all VA outpatient care recorded in the SE file based on the Medicare reimbursement for CPT codes. We used a modified version of the HERC methodology to estimate the costs of the encounters for this analysis (Phibbs, Velez, et al. 2004). For the purposes of this project, some simplifications of the HERC methodology were made to reduce the effort required. The HERC methodology is based on scaling estimated Medicare reimbursement to VA costs. For this project, we treated an estimated Medicare reimbursement as the cost. Further, the Medicare facility payments for some CPT codes are discounted. Since less

than 2% of the procedures recorded in the 2003 SE file were subject to discounting (Phibbs, Velez et al. 2004), we did not correct the Medicare payments for discounting of facility payments in the estimate of costs used for this report. We also did not make any adjustments to the cost estimates for bilateral procedures. While most of these simplifying assumptions had very small effects, the use of Medicare reimbursement instead of estimated VA costs did, on average, increase the cost estimates, compared to the HERC estimates of VA costs. Since the purpose of the cost analyses was to estimate the relative amount of workload excluded from the SE file, the use of Medicare payments instead of VA costs could be expected to have minimal effect.

**Results**

Basic descriptive results. Table 1 provides information on the 10% random sample of the NPCD outpatient encounter data. It reports information for all records and gives subtotals for records with more than 15 CPT codes and for records with 15 or fewer codes. Table 1 shows that, with respect to the current limits on CPT codes in the SE data,

- 9.8% (637,277 out of 6,476,541) of records had at least one repetition of a CPT code,
- 10.5% (1,425,870 out of 13,546,747) of CPT codes were repetitions of other codes in the same record,
- 0.8% (49,377) records had more than 15 CTP codes, and
- 2.0% (273,524) of the CPT codes were excluded by the current 15 CPT code limit.

The counts of CPT code repetitions do **not** include the first use of a CPT code in each record. We also found that 65.0% (4,208,268) of the records in the 10% sample had only 1 CPT code. Additional information on the number of CPT codes and replicate uses of CPT codes are contained in Appendix Table A1.

From the information presented in Table 1, it is clear that most records were not affected by the CPT code limit; only 2% of the CPT codes were excluded by the 15 CPT code limit. But the elimination of repetition of CPT codes within encounters affected a lot of records, and even more of the workload. Just over ten percent of CPT codes were repeat uses of CPT codes within records. Further, 84.5% of the repeat uses of CPT codes within records occurred in records that use no more than 15 CPT code fields (including the replicate codes).

Analysis of repetition of CPT codes. Given the importance of the repeat uses of CPT codes, we examined the repetition of CPT codes to try and determine if they should have been recorded, based on CPT coding rules. To provide some information on the nature of the repetitions of CPT codes recorded in the sample, HERC staff assigned each of the unique CPT codes in the sample to one of nine categories. These categories were designed to classify different types of repetition of use of CPT codes. They have varying degrees in the certainty to which a code can be replicated within an encounter. The categories were:

- Count: CPT codes that represented counts or time increments of services (e.g. 15 minutes of physical therapy) that were clearly designed to be used one or more times within a single encounter.
- Likely: CPT codes that were not specifically designed to represent counts of services, but for which HERC staff determined it was very likely that the repetition of CPT codes within single encounters were appropriate.
- Bilateral: Codes for procedures that can be unilateral or bilateral. Repeat use of these CPT codes is plausible. It was not possible to determine appropriateness of individual repetition without additional information.
- Diagnostic Laboratory Tests: Repeat performances of diagnostic laboratory tests are possible. It is not possible to determine appropriateness without additional information.
- Diagnostic Radiology: Repetitions of diagnostic radiology images are possible. It is not possible to determine appropriateness without additional information.
- Possible: CPT codes that could not be assigned to the other categories. CPT codes in this group had a very wide range in the likelihood that the repetition was appropriate.
- Inpatient: Codes that are reserved for inpatient procedures that should not be used in outpatient encounters. These CPT codes were identified using the Medicare list of CPT codes not eligible for payment for ambulatory facility payments because they can only be performed in inpatient settings.
- Unlikely Bilateral: Codes where a bilateral procedure is possible, but very unlikely, e.g. operating on both knees at the same time.
- Not appropriate: CPT codes for which was it clear that they should not be used more than once in an outpatient encounter.

The results of the classification of the repetition of CPT codes are shown in Table 2. Very few repetitions of CPT codes were clearly inappropriate. Combined, the 'Inpatient' and the 'Not Appropriate' categories contained about 9% of the total repetition of CPT codes. Over half (57%) of the repetitions were codes designed to count units of service or time. Repetition of these codes is appropriate. For 37% of the repeated codes it was not possible to make an exact determination about the appropriateness of the repetitions of use within single patient care encounters.

Table 3 shows the 20 most frequently replicated CPT codes in the sample data. By far, the most commonly repeated CPT code was 97546 (Work hardening/ conditioning; each additional hour). It had a frequency of 245,576, which represented 17.2% of the repeated CPT codes. The second most commonly repeated code was 97110 (Therapeutic procedure, 1 or more areas, each 15 minutes; therapeutic exercises to develop strength and endurance, range of motion, and flexibility), which accounted for 5.7% of the repetitions. Nine of the top twenty CPT codes were CPT codes that

represented counts of services or units of time, which are clearly appropriate for repeated use within a single encounter.

The data in Tables 2 and 3 show that most of the repetition of CPT codes within encounters appears to be legitimate repeat uses of CPT codes. Not allowing repetition of CPT codes has clearly excluded a significant portion of the actual VA workload. Conversely, allowing repetition of CPT codes would not result in large numbers of CPT codes being recorded in the SE data that are clearly inappropriate uses of CPT codes. Further, there does not appear to be an easy method to selectively screen repeat uses of CPT codes. The problem is that in many cases the determination of the appropriateness of the repeated uses of CPT codes would require additional information not contained in the NPCD. If all repeat uses of CPT codes within encounters were to be allowed, analysts using the SE data would still be able determine whether a repetition is appropriate or not.

Should additional data fields be added? We next considered if the number of CPT code fields in the SE data should be increased to accommodate repeat uses of CPT codes. For this HERC considered the percentage of costs that would be excluded in addition to the number (percent) of excluded CPT codes. In other words, how much of the workload, as measured by both costs and CPT codes, would be excluded by different limits on the number of CPT codes allowed in a record?

Table 4 shows how the excluded hypothetical Medicare reimbursement and CPT codes would change under different database design scenerios. If the current limit of 15 CPT codes were maintained, with repetition of CPT codes allowed, 2.0% of the CPT codes and 0.8% of the costs would be excluded. The excluded costs and CPT codes decreases as the number of CPT code data fields is increased. At 20 CPT codes allowed, 0.8% of the CPT codes and 0.4% of the costs were excluded. Beyond 20 CPT codes, the additional gains of adding more data fields were smaller; increasing the limit to 24 CPT codes resulted in the exclusion of 0.5% of the CPT codes and 0.3% of the costs.

To gain an understanding of the workload that would still be excluded with a limit of 20 CPT codes, we examined records having more than 100 codes. In all cases the large number of codes resulted from repeated use of only 1-3 codes. Most represented specified units of supply items or pharmaceuticals. For example, the CPT code for the supply of one foot of oxygen tubing was used up to 100 times in a single record.

In most records where a CPT code was used many times, all other codes associated with the visit appeared first. As a result, these other codes would appear in the SAS extract under the current creation rules. We did observe a small number of records, however, in which repeated CPT codes occupied the initial CPT code data fields, followed by the other CPT codes for the visit. In these cases, limiting the number of CPT codes provides a distorted view of the care provided at the encounter.

**Recommendations**

1. Repeated CPT codes within an encounter should be allowed in the NPCD SE SAS extract.

2. No restrictions should be imposed on which CPT codes can be used more than once in a record. Adding a screen to prohibit "illegal" repetition of CPT codes would impose significant burden on NDS staff with minimal gain, as most of the repetition of CPT codes would be allowed. NDS should make it clear in the documentation for users that all repetition of CPT codes are included. Individual users of the data can delete inappropriate CPT code duplications if their project requires it.

3. The number of CPT code fields in the NPCD SE SAS extract should be increased from 15 to 20. If individual CPT codes are allowed to be used more than once in an encounter, increasing to 20 CPT code fields will more than halve the number of excluded CPT codes in the SE file.

4. A new variable in the NPCD SE SAS extract should report the number of CPT codes associated each encounter that is stored in the Oracle database. This will provide users of the SE file with a count of the number of CPT codes that are excluded from each record.

5. VHA staff should instruct facilities to have the CPT codes that are automatically generated come after the other CPT codes for each encounter.

**Conclusion**

The current programming rules for the creation of the NPCD SE SAS extract that limit the number of CPT codes to 15 and do not allow repetition of CPT codes are clearly censoring significant amounts of data. Over 10% of the CPT codes used to characterized VA outpatient care are repeated uses of CPT codes within the same clinical encounter. An additional 2% of the CPT codes are deleted by the limit of 15 CPT codes.

Allowing CPT codes to be used more than once in an encounter will allow the SE file to more accurately reflect the ambulatory care workload. Only 9% of the repetition of CPT codes were clearly inappropriate duplications, and over half of the repetition of CPT codes were uses of codes explicitly designed be used more than once to count units of services or time.

**Table 1. Summary of 10% Sample of 2003 NPCD Outpatient Visit Data that Allowed Repeat Uses of CPT Codes and up to 500 CPT Codes within a Record**

| | Records with 15 or fewer CPT codes | Records with more than 15 CPT codes | All Records |
|---|---|---|---|
| Number of records | 6,427,164 | 49,377 | 6,476,541 |
| Number of CPT codes | 12,532,568 | 1,014,179 | 13,546,747 |
| Number (percent) of CPT codes that are repeated | 1,206,137 (9.6%) | 219,733 (21.7%) | 1,425,870 (10.5%) |
| Number (percent) of CPT codes excluded by limit of 15 CPT codes (assuming replicates are allowed) | 0 (0%) | 273,524 (27.0%) | 273,524 (2.0%) |

**Table 2. Distribution of Types of Repetition of CPT Codes in a 10% Sample of 2003 NPCD Data**

| Type Code | Frequency | Percent |
|---|---|---|
| Count | 814,505 | 57.12 |
| Likely | 96,878 | 6.79 |
| Bilateral | 8,553 | 0.60 |
| Diagnostic Laboratory | 161,907 | 11.35 |
| Diagnostic Radiology | 5,102 | 0.36 |
| Possible | 210,956 | 14.79 |
| Unlikely Bilateral | 222 | 0.02 |
| Inpatient | 119 | 0.01 |
| Not appropriate | 127,628 | 8.95 |

**Table 3. The 20 Most Frequently Repeated CPT Codes in a 10% Sample of the 2003 NPCD Data**

| CPT | Description | Frequency | Percent | Category |
|---|---|---|---|---|
| 97546 | Work Hardening/Conditioning; Each Additional Hour | 245,576 | 17.22 | Count |
| 97110 | Therapeutic Procedure 1>= Areas, Each 15 Min; Exercises | 81,382 | 5.71 | Count |
| 97150 | Therapeutic Procedure Group | 59,965 | 4.21 | Count |
| 82465 | Cholesterol Serum Or Whole Blood Total | 52,968 | 3.71 | Lab |
| 97537 | Community/Work Reintegration Training, 1 On 1, Each 15 Min | 39,480 | 2.77 | Count |
| 90853 | Group Psychotherapy | 37,323 | 2.62 | Not App |
| 99211 | Office/Outpatient Visit Evaluation &Management, Established Patient, Physician Presence Not Required, <5 Min | 36,278 | 2.54 | Possible |
| 97545 | Work Hardening/Conditioning; Initial 2 Hours | 35,900 | 2.52 | Not App |
| 99499 | Unlisted Evaluation And Management Service | 28,491 | 2.00 | Possible |
| G0154 | Services of Skilled Nurse/Home Health Setting, Each 15 Min | 28,195 | 1.98 | Count |
| 97530 | Therapeutic Activities, 1 on 1, Each 15 Min | 26,379 | 1.85 | Count |
| 17003 | Destruction Benign/Premalignant Lesions 2nd-14$^{th}$, Each | 24,700 | 1.73 | Count |
| 97113 | Therapeutic Procedure 1/> Areas Each 15 Min; Aquatic | 21,693 | 1.52 | Count |
| 97535 | Self Care/Home Management Training, 1 On 1, Each 15 Min | 19,486 | 1.37 | Count |
| 99371 | Phone Call Physician to Patient or Other Provider; Simple/Brief | 16,858 | 1.18 | Possible |
| 99071 | Educational Supplies Provided By Physician | 14,163 | 0.99 | Likely |
| Q0136 | Injection Epoetin (Non ESRD Use) Per 1000 Units | 13,223 | 0.93 | Count |
| 84999 | Unlisted Chemistry Procedure | 13,092 | 0.92 | Lab |
| 99078 | Physician Educational Services Rendered To Group Setting | 12,723 | 0.89 | Likely |
| 89399 | Unlisted Miscellaneous Pathology Test | 12,000 | 0.84 | Lab |

Key
Not App = not appropriate
Lab = laboratory

**Table 4. Effect of Different Limits on the Number of CPT Code Data Fields in the 2003 NPCD Outpatient Encounter Data, Assuming Replicate CPT Codes Are Allowed**

| Limit on number of CPT codes per record | Number (percent) of codes omitted | | Dollar value (percent) of workload omitted | |
|---|---|---|---|---|
| 15 | 273,524 | (2.02%) | $6,897,324 | (0.79%) |
| 20 | 106,008 | (0.78%) | $3,618,419 | (0.42%) |
| 24 | 64,474 | (0.48%) | $2,590,165 | (0.30%) |
| 29 | 45,091 | (0.33%) | $1,921,594 | (0.22%) |

Note: Data are from a 10% sample of the 2003 NPCD. Dollar values represent estimated Medicare reimbursements.

## References

Phibbs CS, Velez JP, Yu W, Barnett PG. (2004). HERC's Outpatient Average Cost Dataset for VA Care: Fiscal Years 2000-2003. Menlo Park, CA: VA Health Economics Resource Center.

## Appendix

Detailed Results on Repeat Uses of CPT Codes.

This appendix provides additional detail on the distribution of the number of CPT codes with records and of replicate CPT codes.

Table A1 provides additional information on the repetition of CPT codes and numbers of CPT codes in records. It features the number of records, the total number of CPT codes in these records, and the number of CPT codes that were repetitions in these records. The counts of repetitions of CPT codes do **not** include the first use of a CPT code in each record.

The first row of Table 1 reports these numbers for the entire file. Each of the following sets of rows show how these numbers were split among records with differing numbers of CPT codes. The first set shows this information for records with 15 or fewer CPT codes compared to records with more than 15 CPT codes. These results are based on records with more or less than the indicated number of CPT codes. The CPT code counts are for all CPT codes in those records. For example, in the first row, there are 49,377 records with more than 15 CPT codes. These records contain 1,014,179 CPT codes, of which 740,655 (15 x 49,377) are in the first 15 CPT code data fields.

**Table A1. Detailed Distribution of CPT Codes and Observations with Large Numbers of CPT Codes in the 10% Sample of the 2003 NPCD Data**

| | Total Number of Records | Total Number of CPT Codes | Total Number of Repetitions of CPT Codes |
|---|---|---|---|
| *Expanded NPCD SE File* | *6,476,541* | *13,546,747* | *1,425,870* |
| | | | |
| | | | |
| CPT codes >15 | 49,377 | 1,014,179 | 219,733 |
| | 0.76% | 7.49% | 15.41% |
| CPT codes <=15 | 6,427,164 | 12,532,568 | 1,206,137 |
| | 99.24% | 92.51% | 84.59% |
| | | | |
| | | | |
| CPT codes >20 | 14,958 | 405,168 | 143,971 |
| | 0.23% | 2.99% | 10.10% |
| CPT codes <=20 | 6,461,583 | 13,141,579 | 1,281,899 |
| | 99.77% | 97.01% | 89.90% |
| | | | |
| | | | |
| CPT codes >24 | 5,249 | 190,450 | 112,661 |
| | 0.08% | 1.41% | 7.90% |
| CPT codes <=24 | 6,471,292 | 13,356,297 | 1,313,209 |
| | 99.92% | 98.59% | 92.10% |
| | | | |
| | | | |
| CPT codes >29 | 2,607 | 120,694 | 96,780 |
| | 0.04% | 0.89% | 6.79% |
| CPT codes <=29 | 6,473,934 | 13,426,053 | 1,329,090 |
| | 99.96% | 99.11% | 93.21% |
| | | | |
| | | | |
| CPT codes >49 | 767 | 53,616 | 49,414 |
| | 0.01% | 0.40% | 3.47% |
| CPT codes <=49 | 6,475,774 | 13,493,231 | 1,376,456 |
| | 99.99% | 99.60% | 96.53% |

Note: The counts of repetitions of CPT codes do **not** include the first use of these CPT codes in each record.